Solutions for Demanding Applications

VarTech Systems Inc.

Industrial CRT and Flat Panel Displays

VT190 DiamondVue Series
19.0" Flat Panel Series LCD Monitors
VT190C2 · VT190P2 · VT190R2
VT190P-SS · VT190W2 · VT190M2

User's Guide

Read these instructions completely before attempting to operate your new Color Display.

Table Of Contents

1.1 About LCD Monitors

What you gain by using an LCD monitor in your industrial controls

LCDs

are the future of display technology. CRTs although they have dropped in cost significantly, do not offer the performance, reliability, and mounting options available with LCDs. LCD monitors consist primarily of an LCD, Video Board and a Back Light video. The LCD determines to a large extent the viewing angle, brightness and contrast. Beyond that it is the function of the video board which converts the analog RGB (Red, Green, Blue) signals from a standard video card to a high quality, digital RGB that the LCD can display.

Recently the video card has taken on a new role. It is the responsibility of this device to "scale" a particular video resolution to the "native" resolution of the LCD. Simply, consider that a computer is putting out a VGA [640x480] resolution signal, yet the LCD that is connected is an XGA [1024x768] display. The displayed picture would be in the center 1/3 of the LCD. With the introduction of the scaling engine. The converter will mathematically recalculate the 640x480 to 1024x768. This may sound simple but it is in fact a complex algorithm that adjusts for different aspect ratios and pixel alignment, essentially smoothing text and graphics to produce a picture that is pleasant to the eye.

All Vartech displays from 12.1" (800x600) to 23.1 (1600x1200) incorporate scaling engines in the converter card.

1.1 Product Safety Precautions

⇒ Ensure that sufficient space is available around the display to provide the circulation necessary for cooling.

⇒ Ensure that the ambient air temperature will not exceed the specified maximum temperature.

⇒ Do not attempt to service this display yourself. The rear chassis has a seal so that non qualified personal will not expose themselves to dangerous voltages or other risks.

⇒ To protect from electrical shock, unplug the display power supply from the wall before moving.

⇒ Do not expose the display to direct sunlight or heat.

⇒ Do not use this display near water

⇒ Do not place any heavy objects on the power cords. Damage may cause electrical shock.

⇒ Unplug the power supply from the wall or unit if one of the following conditions exists.
  ⇒ Power cord or plug is damaged or frayed
  ⇒ Liquid is spilled into the display or the display is exposed to rain or water.
  ⇒ The display does not operate normally when the operating instructions are followed.
  ⇒ The display has been dropped or the enclosure has been damaged.
  ⇒ The display exhibits a distinct change in performance, indicating a need for service.

2

2.1 VT190 Series Display Features

⇒ Capable of displaying unlimited colors in a continuous spectrum. The high contrast LCD enhances the image with no geometric distortion.

⇒ The VT190 DiamondVue Series directly accepts an analog 5 wire RGB with separate H/V sync or 4 wire RGB with separate combined sync or 3 wire SOG.

⇒ The VT190 DiamondVue Series is auto synchronous adjusting the display to the appropriate input between VGA, SVGA,XGA, and SXGA.

⇒ The VT190 DiamondVue Series is available in Panel Mount, Rack Mount, or Wall Mount industrial packages.

⇒ The VT190 DiamondVue Series is supplied with a Anti-Reflective Screen unless equipped with an optional Touch System.

⇒ The VT190 DiamondVue Series has an integrated 115/220VAC supply as standard on all models.

2.2 Unpacking and setting up your display

Your LCD monitor package will consist of the components listed below. Open shipping container and lay all components on a flat clean surface.

2.3 What is included with your display

- ⇒ VT190R2, VT190P2, VT190C2, VT190W2 or VT190M2 LCD Monitor
- ⇒ 5 ft Video Cable
- ⇒ 10-32 Mounting Hardware. (For use with Panel Mount only)
- ⇒ 6 ft RS232 Touch Interface Cable (Optional when touch is installed)
- ⇒ CD ROM with Touch Screen Drivers (Optional when touch is installed)
- ⇒ Users Guide (Printed or on CD)

2.4 Connecting the Display

1. Connect all cables to the computer first. This would include the VGA cable and the optional RS 232 serial touch screen connection.

2. After connecting the cables between the LCD monitor and the computer, plug the power cord into the 115/220VAC power outlet.

3. Once the 115/220VAC connection is made, the display is active.

4. If your computer was off, turn on your computer.

5. Your display should now operate as a normal computer display showing your windows or whatever video is being sent to the flat panel.

Note: If for any reason the display goes blank and gives an "out of Range" or "No Input Signal", your computer or video source is putting out a signal that is out of range of the LCD's video board. If this happens, reboot the computer or video source and make sure you are inputting the correct signal. If the display doesn't work properly, it may be because:

(a) The resolution is to high or low for the LCD.
(b) The refresh rate is set to high. Refresh on an LCD is different than a CRT. Set the refresh to 60Hz. CRT's need a high refresh rate to avoid flicker. The refresh rate has no impact on LCD's.
(c) The power source is incorrect.
(d) The unit is malfunctioning. If you believe this to be true, disconnect the video cable from the rear of the LCD and connect to a known good computer CRT display. If the computer display is working satisfactory and the video is within the appropriate range, then contact Vartech Customer service for a RMA number at 800-223-8050.

2.5 Signal Connections

To avoid irregular operation and /or damage to the display, please insure correct video is being supplied as shown on the following page.

2.5 Signal Connections Cont.

You can use an HD-15 connector cable or a BNC adapter cable to connect the flat panel monitor to the host computer. The HD-15 video cable (supplied in the kit) you use with this monitor is equipped with a conventional HD-15 connector at each end.

Note: The following figure is the view looking into the pin end of the male connector or solder term end of the female connector.
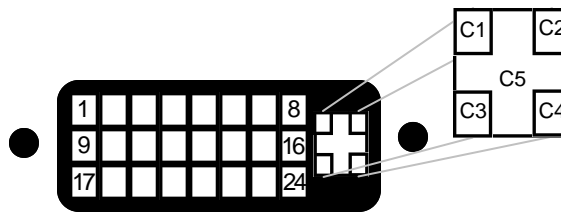
HD15 Connector
The following table provides the pin numbers and corresponding pin assignments for the HD-15 video connector.

Pin	Signal	Pin	Signal	Pin	Signal
1	Red Video	6	Red Video Ground	11	Not Used
2	Green Video	7	Green Video Ground	12	Bi-Directional Data
3	Blue Video	8	Blue Video Ground	13	Horizontal Sync
4	Not Used	9	No Connection	14	Vertical Sync
5	Return	10	Sync Ground	15	Data Clock (SCL)
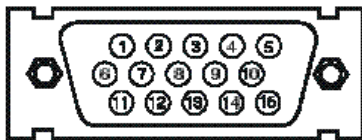
HD15 Connector

DVI-I Connector (Digital / Analog)

DVI-I

Pin	Signal
C1	Analog Red
C2	Analog Green
C3	Analog Blue
C4	Analog H. Sync
C5	Analog Ground

DVI-I

Pin	Signal	Pin	Signal	Pin	Signal
1	T.M.D.S. Data2-	9	T.M.D.S. Data1-	17	T.M.D.S. Data0-
2	T.M.D.S. Data2+	10	T.M.D.S. Data1+	18	T.M.D.S. Data0+
3	T.M.D.S. Data2/4 Shield	11	T.M.D.S. Data1/3 Shield	19	T.M.D.S. Data0/5 Shield
4	T.M.D.S. Data4-	12	T.M.D.S. Data3-	20	T.M.D.S. Data5-
5	T.M.D.S. Data4+	13	T.M.D.S. Data3+	21	T.M.D.S. Data5+
6	DDC Clock	14	+5V Power	22	T.M.D.S. Clock Shield
7	DDC Data	15	Ground (return for +5V, H. Sync and V. Sync)	23	T.M.D.S. Clock+
8	Analog Vertical Sync	16	Hot Plug Detect	24	T.M.D.S. Clock-

Composite Video Input Connector: CVBS 1.0V p-p
S-Video: S-VHS
LUMA Signal Input 0.7V p-p
CHROMA Signal Input 0.7V p-p

## 2.5 Signal Connections Cont.

Optional BNC Adaptor Cable

A 5BNC-to-HD15 adapter cable is available. The functions of the cables are described below.
⇒ **R**, **B**, and **G**: Red, Green, and Blue input connectors to establish color.
  These are used for RS-343 analog signals.
⇒ **HS/CS**: Separate horizontal/composite sync signal from the video
  source.
⇒ **VS**: Separate vertical sync signal from the video source.
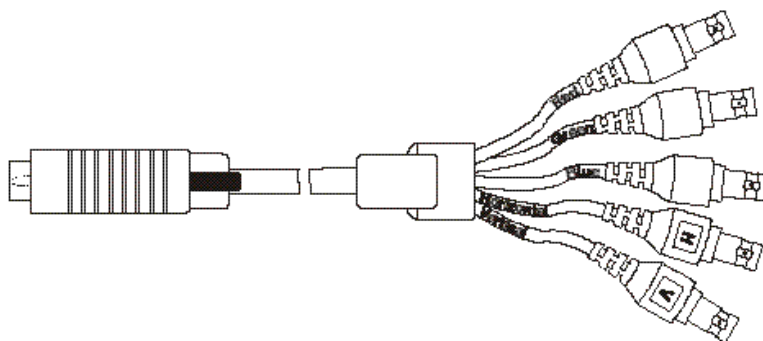
BNC Adapter Cable
This table describes the signal types you can use with the connectors:

BNC Signal Types						
BNC Signal Type	**Description**	**R**	**G**	**B**	**HS/ CS**	**VS**
Sync-on-Green (Not Available)	Use the three video connectors. Horizontal and vertical syncs are supplied on the green video line.	X	X	X		
Composite Sync (Not available)	Use the three video connectors plus the horizontal sync/ composite sync input	X	X	X	X	
Separate Horizontal and Vertical Sync.	Use the three video connectors plus the horizontal sync/ composite sync and vertical sync input.	X	X	X	X	X

3

GETTING STARTED

3.1 Adjusting the display

Membrane Controls
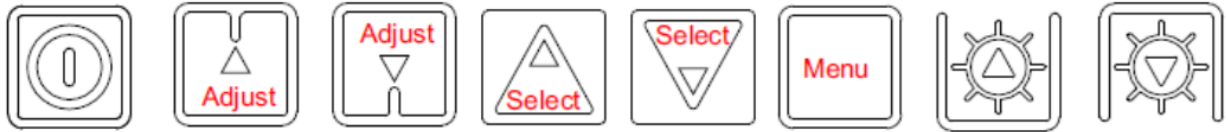
3.2 Key Name and Function

Controls	Analog VR type	Digital type
On/Off – turns controller board power on	VR toggle switch	On/Off button
Brightness – controls backlight brightness	Rotary VR	Brightness +/- buttons
Menu – turns OSD menu On or Off (it will auto time off) (Function with signal input only)	Menu button	Menu button
Select – Select function / Confirm (under OSD menu on state)	SEL DN	SEL DN
Move up to select individual RGB color level OSD page (under OSD menu on state)	SEL UP	SEL UP
+ – increase the setting / moves the selector to the next function (under OSD menu on state)	+	+
- - decrease the setting / moves the selector to the previous function (under OSD menu on state)	-	-
Load factory default	Press and hold SEL DN button to power on the controller	Press and hold SEL DN button to power on the controller
Lock OSD menu (Function with signal input only)	Press and hold MENU button for 15 seconds to enable / disable lock of the OSD menu	Press and hold MENU button for 15 seconds to enable / disable lock of the OSD menu
Switch to next input source (under OSD menu off state)	+	+

3.3 OSD Adjustment

Picture :

Volume   Increase/decrease volume level, total 31 steps

Brightness   Increase/decrease panel brightness level, total: 100 steps

Contrast   Increase/decrease panel contrast level, total: 100 steps

Hue *   Increase/decrease Hue level, total: 100 steps

Saturation *   Increase/decrease saturation, total: 100 steps

Sharpness   Increase/decrease sharpness, total: 15 steps

Aspect Size **4**

    Aspect Ratio : Fill Screen / Fill Aspect / 1 to 1 (UNDER ARGB / DVI mode)
                  Auto / Fill Screen / 1 to 1 / Anamorphic (UNDER VIDEO MODE)
                  - Fill Screen : Enable full screen expansion for lower resolution Image
                  - Fill Aspect : Enable fill screen expansion for lower resolution image
                        according to aspect ratio
                  - 1 to 1 : Display the exact image resolution on the screen without
                        image expansion.

Horz Position   Move the image position horizontally

Vert Position   Move the image position vertically

Blue Only : OFF / ON : Turn off the "Red" & "Green" channel (i.e output all zero to Red &
                Green channel)

* : DISPLAY IN VIDEO MODE ONLY

	Main Source : Select the input video signal VGA 1 / Composite Video / S-Video / VGA 2 / DVI **/** HD/SD Component

	Utilities :
	
	Setup 4
	Auto Picture Setup[#] 4 : Auto adjust the image position, phase and size
	Auto Color Gain[#] 4 : Auto Color Calibration (Function in ARGB mode ONLY – See appendix IV)
	
	Manual Clock[#] : Adjust the image horizontal size
	
	Manual Phase[#] : Fine tune the data sampling position (adjust image quality)
	Auto Source Seek : OFF / ON
	    ON – Auto source select always enable
	    OFF – Disable auto source select function
	Auto Power : OFF / ON
	    ON – Enable soft power off function if absence of input signals
	    OFF – Disable soft power function
	Video Standard (SD)** : Auto / NTSC / PAL / SECAM / NTSC 443
	Gamma : 1.0 / 1.6 / 2.2
	
	OSD 4
	
	H Position : Move the OSD menu image horizontally
	
	V Position : Move the OSD menu image vertically
	Timeout (sec) : 1 – 20 : Adjust the OSD menu timeout period in a step of 1 seconds (max 20 seconds)
	Language : English / Simplified Chinese : Select OSD menu language display
	
	Transparency : 0 – 100 steps
	
	Color Temperature 4
	Color Temp : 9300K / 8000K / 6500K / 5000K
	
	Red :
	
	Green :
	
	Blue :
	
	Hot Key 4
	Hot key 1 : Brightness / Contrast / Input / Aspect / Volume
	Hot key 2 : Brightness / Contrast / Input / Aspect / Volume
	
	Reset to Factory Defaults 4
	Factory Defaults
	Reset Color Gain[#]
	DDC Updates
	
	                ** : FUNCTION IN VIDEO MODE ONLY
	                # : DISPLAY AND FUNCTION IN VGA MODE ONLY

4

4.1 Touch Screen Introduction

Touch screens are a common means to interface operator inputs to a system. The universal standard of Windows GUI (Graphical User Interface) has significantly increased the use of touch screens.

There are five main touch technologies. The technologies are resistive, surface acoustic wave (SAW), capacitive, infrared (IR), and projective capacitive. Each touch technology has advantages and disadvantages based on different user applications.

4.2 Installation

All Vartech Systems displays configured with a touch screen are supplied with a CDROM which includes user manuals, application software, and drivers for various operating systems. Insert the supplied CDROM into a CDROM drive and follow the installation instructions that will appear on the screen.

Technical support is available by contacting Vartech Systems customer support at 800-223-8050.

5

Troubleshooting	
Trouble	**Troubleshooting Tip**
No Picture	⇒ The signal cable should be properly connected to the display card and computer. ⇒ Try disconnecting the video cable from the display and connecting to a CRT display if available to confirm the presence of proper video. ⇒ Make sure power is connected to the proper DC or AC source. ⇒ Make sure the resolution mode is supported by the display and check settings of the display card. ⇒ Confirm that the video cable is not defective.
Image Persistence	Image persistence occurs when a ghost of an image remains on the screen after the monitor has been turned off. Unlike a CRT monitor, an LCD monitor's image persistence is not permanent. To erase an image ghost, turn the monitor off for as long as the image was displayed. If the image was on for one hour and the ghost of the image remains, the display should be turned off for one hour to erase the image. To avoid this problem, use a screen saver.
Picture Quality & Image Stability	⇒ Check for proper video cable for proper grounding and shielding. ⇒ Check the signal source for proper signal. ⇒ Check for proper adjustment of the Phase and Frequency controls. ⇒ Check for proper recommended signal timing.
Green LED not lit	Check for proper power and power connections
Green LED blinking	This indicates absence of video or proper video for this display
Display image is not properly sized	⇒ Adjust the Vertical and Horizontal size controls via the OSD. (Reference setup adjustments) ⇒ Ensure that a supported mode is selected on the display card or system being used. Consult the display card or system manual for proper video.
No S-Video or NTSC operation	⇒ Check for proper connections. ⇒ Check the setup instructions for proper input selection.
If these tips do not solve your problem, contact Vartech Systems Customer Service support.	

Troubleshooting Cont.

Trouble	Troubleshooting Tip
Screen is blank.	Screen saver activated. Video Cable problem. Check for proper installation Change video cable . Faulty video display. Needs Service.
Image is dim, even with brightness and contrast controls set full UP	Video cable problem. Check for proper installation of cables Faulty video source. Faulty display.
Image not centered	Reset the horizontal and vertical positioning using the on-screen menu. Check to see if video source is operating within the monitor's range
Image will not adjust	Video timing outside of range. Use the on-screen menu to ad just the Clock Setting. Make sure timing is within VESA standard.
Image is not stable.	Monitor has incorrect or bad sync signals. Check for proper video cable installation. Replace suspected faulty cable. Check to ensure that video source is operating within the display's range.
Vertical shaded bars on Screen image	Horizontal size not properly adjusted. Adjust horizontal size settings
Colors are missing	Faulty video cable. Missing from video source. Connect video source to another display
Screen jitter or noisy display	Monitor clock phase not properly adjusted
Slight distortion in text or Graphics.	Not working in native resolution.
Display is present but "bars" Appear or roll across screen	Ground loop problem between computer and display Interference from adjacent equipment
The background looks Acceptable but text and Icons seem to be missing rows of pixels	Video running interlace mode.

6

Cleaning

Occasionally clean the display panel and cabinet with a soft cloth dampened (not soaked) with a mild (non-abrasive) glass cleaner. Keep turning a fresh side of the cloth toward the screen surface to avoid scratching it with accumulated grit.

Note:
The solvent should be applied only to the cloth, and not directly on the monitor screen.

Do not use paper products as they may scratch the surface. To minimize the risk of abrasion, allow the screen to stand dry.
Special care should be taken when cleaning a touch screen or polycarbonate shield that is installed over the screen. Abrasive and certain chemical cleaners can easily damage the surface.
Never use alcoholic or ammoniac cleaners to clean the polycarbonate shield or a touch screen.

Note:
For best results cleaning a monitor with the optional antireflective tempered glass display shield, a solution of denatured alcohol is recommended to thoroughly clean the display.

Replacing a Line Cord

To avoid shock and fire hazards, the monitor's power cord should be replaced if the insulation becomes broken or if it develops a loose internal connection.

Other Maintenance

Qualified service personnel should perform all maintenance, except for the power cord replacement described above.

7

MOUNTING INSTRUCTIONS

Mechanical Drawings

Model	Description	Page(s)
VT190P2	19.0" Panel Mount Mechanical Drawing	18-19
VT190R2	19.0" Rack Mount Mechanical Drawing	
VT190W2	19.0" Wall Mount Mechanical Drawing	
VT190M2	19.0" Tabletop Mechanical Drawing	
VT190C2	19.0" Chassis Mount Mechanical Drawing	

7.1 Panel Mount Procedure

Panel Mounting Procedure
1. Cut and drill the panel (refer to panel mount drawing). Measurements are in inches.

Panel Mounting Cutout
2. If access to the side of the monitor is not available following installation, attach the power and video cables to the side of the monitor at this time.
3. Install the monitor in the prepared cutout.
4. Install the lock nuts and washers, supplied with the monitor, behind the holes running along the sides and top/bottom of the cutout in the panel. Extra lock nuts and washers are provided.
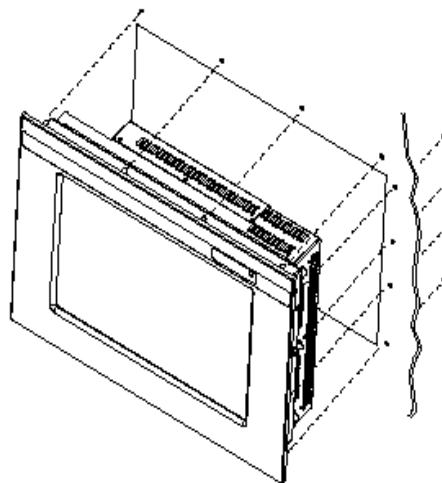
Note:
Use #10-32 nuts for mounting.

5. Tighten all mounting nuts evenly to a torque of 24 inch-pounds.
ATTENTION: Mounting nuts must be tightened to a torque of 24 inch-pounds to provide panel seal and avoid potential damage. Vartech Systems assumes no responsibility for water or chemical damage to the monitor or other equipment within the enclosure due to improper installation.
6. Attach the power and video cables to the side of the monitor if you have not already done so.

Generic Panel Mount Diagram

8

SPECIFICATIONS

ENGINEERING SPECIFICATIONS	
Panel Size	19.0"
Type	TFT Active matrix w/ Anti-Glare coating
Resolution Capabilities	VGA to SXGA
Pixel Pitch	0.294mm
Active Display Area	14.81" x 11.85" 376.3mm x 301.06mm
Pixel Format	640 x 480, 800 x 600, 1024 x 768, 1280 x 1024
Viewing Angle (Left/Right)	85/85º
Viewing Angle (Up/Down)	85/85º
Contrast Ratio	1000:1

Brightness	VT190P2, VT190PSS2, VT190R2, VT190C2, VT190W2, VT190M2:
	    380 Nits
	Transflectives:
	    over 1000 Nits*

Response Time	T_R = 15ms typical T_F = 10ms typical
Back Lights	Cold Cathode 50,000 Hrs. Half Life
Video Connector	HD15(F) DVI-I 29Pin connector (Digital/Analog) Composite Video (CVSC) S-Video (S-VHS)
Colors Supported	16.7M
Video Input	RGB Analog (0.7V p-p / 75ohm) , Digital CVBS (1.0V p-p) S-VHS, luma/chroma (.7V p-p / 75ohm)
Sync	Separate H&V, Combined, SOG (Sync On Green), Digital
Input Voltage	AC 100-240V 50/60Hz 1.0A
Power consumption	Normal: 70Watts DPMS: < 3Watts
Operating Temperature	0 to 50ºC
Storage Temperature	-20 to 60ºC
Operating Humidity	10 to 95%NC
Storage Humidity	10 to 95%NC
Operating Altitude	Up to 10,000 ft
Storage Altitude	Up to 40,000 ft

*Outdoor Brightness Equivalent (Varies depending upon sunlight brightness)

VARTECH SYSTEMS

HEADQUARTERS

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